

Specification

Title of the Invention

Memory Information Backup Method and  
System for Cell Phone

5

Background of the Invention

The present invention relates to backup of memory information in a cell phone and, more particularly, to a backup method and system for memory information in a cell phone, which back up/restore information by using electronic mail.

Conventionally, as a backup method of this type, the method disclosed in Japanese Patent Laid-Open No. 2001-352584 (reference 1) has been proposed.

15 According to this method, write and erase logs associated with mail transmission/reception and the like are monitored. When a predetermined transfer start condition is satisfied, user information such as telephone numbers and addresses written in the built-in 20 memory of a cell phone is automatically uploaded (backed up) to a service station. The backup data is downloaded from the service station in accordance with a download request from the user.

In addition, Japanese Patent Laid-Open 25 Nos. 2002-218091 (reference 2), 2001-177624 (reference 3), and 2002-111899 (reference 4) have proposed a backup method of backing up information such as telephone

numbers from a cell phone to an external terminal and backing up information from the cell phone to a data center through a personal computer by using electronic mail. According to this backup method, information such 5 as telephone numbers from a cell phone is converted into information in the CSV (Comma Separated Value) format or text format and transmitted to an external terminal or the like by electronic mail.

As information (memory information) that can 10 be stored in a cell phone has increased in type and quantity every day, memory information has increased in importance. For this reason, a more significant loss occurs when important memory information is lost. In addition, malicious attempts to destroy, alter, and leak 15 data have increased in degree of danger. Under the circumstances, demands have arisen for a memory information backup method with high safety and simplicity.

Most of conventional backup methods for cell 20 phones are designed to back up memory information from a cell phone to a predetermined terminal or the like directly or through an intermediate management center or the like, posing problems in terms of security.

#### Summary of the Invention

25 It is an object of the present invention to provide a backup method and system which can maintain the safety and reliability of the system by improving

security.

It is another object of the present invention to provide a backup method and system which can monitor unauthorized use of memory information in a cell phone.

5           In order to achieve the above objects, according to the present invention, there is provided a backup system which backs up memory information in a cell phone to a terminal by transmitting/receiving electronic mail, wherein the terminal comprises

10          instruction mail creating means for creating, as backup instruction mail, electronic mail having information for instructing to perform backup stored in a header portion, and backup means for analyzing the header portion of the received electronic mail, and when

15          detecting that the mail is backup response mail from the cell phone, decoding a text of the received backup response mail and backing up the text, and the cell phone comprises response mail creating means for analyzing the header portion of the received electronic

20          mail, creating, as backup response mail, electronic mail having a text in which the memory information in the cell phone is coded and written, when detecting that the mail is backup instruction mail from the terminal, and transmitting the mail to the terminal.

25          Brief Description of the Drawings

Fig. 1 is a functional block diagram showing the backup operation of a memory information backup

system for a cell phone according to the first embodiment of the present invention;

Fig. 2 is a functional block diagram showing the restore operation of the memory information backup system for the cell phone according to the first embodiment of the present invention;

Fig. 3 is a block diagram showing the arrangement of a terminal as a component of the system shown in Figs. 1 and 2;

Fig. 4 is a block diagram showing the arrangement of a cell phone as a component of the system shown in Figs. 1 and 2;

Fig. 5A is a view showing an example of the header portion and text data of electronic mail, and Fig. 5B is a view showing an example of an instruction content and authentication information to be added;

Fig. 6 is a flow chart showing backup instructing operation in the terminal in Figs. 1 and 3;

Fig. 7 is a flow chart showing backup operation in the cell phone in Figs. 1 and 4;

Fig. 8 is a flow chart showing backup response mail receiving operation in the terminal in Figs. 1 and 3;

Fig. 9 is a flow chart showing restore instructing operation in the terminal in Figs. 2 and 3;

Fig. 10 is a flow chart showing restore operation in the cell phone in Figs. 2 and 4;

Fig. 11 is a flow chart showing restore completion notification mail receiving operation in the terminal in Figs. 2 and 3; and

Figs. 12A and 12B are functional block  
5 diagrams showing the backup operation of a memory information backup system for a cell phone according to the second embodiment of the present invention.

Description of the Preferred Embodiments

A memory information backup system for a cell  
10 phone according to the first embodiment of the present invention will be described with reference to Figs. 1 to 4. Fig. 1 shows backup operation in a backup system constituted by a terminal 1 formed from a personal computer (PC) and a cell phone 2 which backs up memory information 2b to the terminal 1 by using electronic  
15 mail. All data are transmitted and received by electronic mail between the terminal 1 and the cell phone 2.

The terminal 1 includes an instruction mail  
20 creating section 1a which creates backup instruction mail for instructing to transmit the memory information 2b stored in the cell phone 2 and transmitting the mail to the cell phone 2, a backup data creating section 1b which receives backup response mail containing the  
25 memory information 2b transmitted from the cell phone 2 and creates backup data of the memory information 2b contained in the backup response mail, and a memory

information recording section 1c which records the created backup data of the memory information 2b on a recording means (to be described later). The backup data creating section 1b and memory information

5 recording section 1c constitute a backup means.

The cell phone 2 includes a response mail creating section 2a which creates backup response mail containing the memory information 2b in response to backup instruction mail from the terminal 1 and

10 transmits the mail to the terminal 1, and an acceptance mail creating section 2c serving as a notification means for creating backup instruction acceptance mail for notifying a predetermined destination of a backup processing result. The memory information 2b

15 constituted by data such as an address book and phone directory (telephone numbers and destination addresses) is stored in a memory section (to be described later).

An outline of backup operation for the memory information 2b will be described next with reference to

20 Fig. 1. The instruction mail creating section 1a of the terminal 1 creates backup instruction mail and transmits it to the cell phone 2. The response mail creating section 2a of the cell phone 2 creates backup response mail containing the memory information 2b in response to

25 the received backup instruction mail, and transmits it to the terminal 1. The backup data creating section 1b of the terminal 1 extracts the memory information 2b

from the received backup response mail. The memory information recording section 1c stores the extracted memory information 2b as backup data in a hard disk or the like.

5 Fig. 2 shows restore operation in a backup system which restores the memory information stored on the terminal 1 side into the cell phone 2. The terminal 1 includes the memory information recording section 1c in which the memory information 2b is stored, an  
10 instruction mail creating section 1d which creates restore instruction mail containing the memory information 2b and transmits it to the cell phone 2, and a restore end confirming section 1e which receives restore completion notification mail from the cell phone  
15 2 and confirms the end of restore.

The cell phone 2 includes a restore data creating section 2e which receives restore instruction mail from the terminal 1, extracts the memory information 2b from the restore instruction mail, and  
20 restores it into a memory section (to be described later), a completion notification mail creating section 2f which creates restore completion notification mail upon completion of restore in accordance with an instruction from the restore data creating section 2e,  
25 and an acceptance mail creating section 2g serving as a notification means for creating restore acceptance mail in accordance with an instruction from the restore data

creating section 2e so as to notify a predetermined destination of a restore processing result.

An outline of restore operation for the memory information 2b will be described next with reference to

5 Fig. 2. First of all, the instruction mail creating section 1d of the terminal 1 creates restore instruction mail (electronic mail) containing the memory information 2b backed up to the memory information recording section 1c, and transmits it to the cell phone 2. Note that the  
10 instruction mail creating section 1d may create restore instruction mail by selecting information, from the memory information 2b backed up to the memory information recording section 1c, which is to be restored into the cell phone 2, instead of transmitting  
15 all the backup information. The restore data creating section 2e of the cell phone 2 extracts memory information contained in the received restore instruction mail and restores it. When the restore operation is completed, the completion notification mail  
20 creating section 2f creates restore completion notification mail and transmits it to the terminal 1.

In either backup operation or restore operation for memory information, some means must be provided to monitor unauthorized use of the system,  
25 e.g., intrusion into the system, data destruction, and data alteration. For this purpose, upon acceptance of processing from the terminal 1, the acceptance mail

creating sections 2c and 2g of the cell phone 2 notify a transmission destination registered in the cell phone 2 of backup instruction acceptance mail and restore instruction acceptance mail which contain processing 5 contents such as reception and acceptance of instruction mail, transmission of response mail, mail transmission/reception dates, and transmission/reception counts. The notification destination registered in the cell phone 2 in advance may be any destination as long 10 as it can be finally checked by an authorized user who has performed backup processing or restore processing, e.g., the owner/user of the cell phone 2 or terminal 1.

In order to authenticate the sender of instruction mail and check its validity, authentication 15 information is attached to the header portion of electronic mail to be used in backup operation and restore operation. On the transmitting side, memory information is coded by a predetermined scheme at the time of transmission of electronic mail. On the 20 receiving side, the memory information is decoded at the time of reception of the electronic mail, thereby preventing tapping and the like of mail. In the above manner, memory information in the cell phone can be backed up/restored with ease and safety without using 25 any special hardware or the like.

The detailed arrangement of the above backup system will be described next with reference to Figs. 3

and 4.

Referring to Fig. 3, the terminal 1 is comprised of a key input section 10 which instructs to transmit mail, a mail accepting section 11 which accepts 5 electronic mail (backup response mail, restore completion notification mail, and backup/restore instruction acceptance mail) from the cell phone 2, a header creating/analyzing section 12 which performs header creation/analysis processing 12a for electronic 10 mail in accordance with an instruction from the mail accepting section 11, a data creating/analyzing section 13 which performs mail text creation and analysis processing 13a for electronic mail in accordance with an instruction from the mail accepting section 11, a recording section 14 which records backup data of memory information output from the data creating/analyzing section 13, a mail creating section 15 which creates electronic mail (backup instruction mail and restore instruction mail) in accordance with outputs from the 15 header creating/analyzing section 12 and data creating/analyzing section 13, a transmitting/receiving section 16 which transmits the electronic mail created by the mail creating section 15 and outputs received electronic mail to the mail accepting section 11, and a 20 mail display section 17 which displays the electronic mail received by the mail accepting section 11.

The header creating/analyzing section 12 and

data creating/analyzing section 13 respectively have pieces of registration information 13a and 13b which are registered in advance for authentication.

The mail accepting section 11 activates the  
5 header creating/analyzing section 12 and data  
creating/analyzing section 13 to create instruction mail  
to be transmitted to the cell phone 2 when detecting  
operation indicating an instruction mail transmission  
instruction from the key input section 10 of the  
10 terminal 1 or receiving response mail from the cell  
phone 2 which has been received by the  
transmitting/receiving section 16.

When the header creating/analyzing section 12  
is activated by the mail accepting section 11 to  
15 transmit instruction mail to the cell phone 2, the  
section 12 creates information (intra-header  
information) to be contained in the header of  
instruction mail. Upon receiving response mail from the  
cell phone 2, the header creating/analyzing section 12  
20 analyzes the information contained in the header of the  
received response mail and performs processing in  
accordance with authentication and the response content.  
In performing authentication processing, the header  
creating/analyzing section 12 creates authentication  
25 information to be contained in the header portion of  
electronic mail to be transmitted to the cell phone 2 on  
the basis of the registration information 12b. In

addition, the header creating/analyzing section 12 performs authentication on the basis of the authentication information contained in electronic mail received from the cell phone 2 and the registration information 12b. That is, the header creating/analyzing section 12 has a function of creating and confirming authentication information for security management, performs personal identification, and checks the validity of an instruction/response on the basis of registration information and authentication information. The header creating/analyzing section 12 also performs instruction/response processing.

Figs. 5A and 5B show examples of the data format of electronic mail and authentication information. In general, as shown in Fig. 5A, a mail header portion is constituted by a message ID (Message-Id:), sender address (From:), transmission destination address (To:), subject (Subject:), date (Date:), and the like. In this embodiment, as shown in Fig. 5B, information (MB-Direction-Code: backup) of a backup instruction which is the content of an instruction to the terminal 1 and authentication information (MB-Authentication-Info: xxxxxxxx) are written before the sender address (From:).

Authentication information is written as a set of specific header information of electronic mail and personal identification information obtained by

computing the header information according to a specific algorithm. For example, as specific header information, authentication information is set by writing, as personal identification information in an authentication item (Authentication-Info:), information for specifying a character string in a predetermined item in the header portion (e.g., information specifying the character string <Fri. 25 Oct ..... +0900> written below Date:) and a numerical value obtained by regarding the character codes of information (character string) as numerical values and performing an arithmetic operation for them according to a predetermined algorithm (e.g., modulo- $2^n$  ( $n$  is an integer equal to or more than 2) arithmetic operation for the sum of the respective character codes of the character string  $x$  a predetermined numerical value).

When such authentication information is to be used, the terminal 1 performs an arithmetic operation for a character string at the time of transmission of instruction mail according to an algorithm set in advance between itself and the cell phone 2, and inserts the resultant information as personal identification information (numerical value) in the header portion. Upon receiving the instruction mail, the cell phone 2 extracts authentication information from the header portion of the mail, and extracts information such as an identical character string. The cell phone 2 then

performs an arithmetic operation based on the same algorithm, and detects coincidence with the authentication information (numerical value) of the instruction mail, thereby performing authentication.

5           The data creating/analyzing section 13 codes/decodes memory information based on the pre-registered registration information 13b, i.e., codes transmission data corresponding to an electronic mail text or the like and decodes reception data. The  
10 registration information contains key information for coding/decoding.

             The mail creating section 15 writes the intra-header information created by the header creating/analyzing section 12 in the header portion of  
15 electronic mail, and writes the data created by the data creating/analyzing section 13 as data in the electronic mail text. The mail creating section 15 then outputs the resultant mail as backup instruction mail to the transmitting/receiving section 16. The  
20 transmitting/receiving section 16 transmits the backup instruction mail created by the mail creating section 15 to the cell phone 2, and outputs to the mail accepting section 11 response mail received from the cell phone 2. The mail display section 17 displays backup response  
25 mail, restore completion notification mail, backup instruction acceptance mail, and restore instruction acceptance mail received from the cell phone 2.

Referring to Fig. 4, the cell phone 2 is comprised of a mail accepting section 21 which accepts electronic mail (backup instruction mail and restore instruction mail) from the terminal 1, a header creating/analyzing section 22 which creates and analyzes the header of electronic mail in accordance with instructions and the like from the mail accepting section 21, data creating/analyzing section 23 which performs mail text creation/analysis processing 23b in accordance with instructions and the like from the header creating/analyzing section 22, a memory section 24 which records memory information and the like, a mail creating section 25 which creates electronic mail on the basis of outputs from the header creating/analyzing section 22 and data creating/analyzing section 23, a transmitting/receiving section 26 which transmits electronic mail created by the mail creating section 25 and outputs received electronic mail to the mail accepting section 21, and a mail display section 27 which displays the electronic mail accepted by the mail accepting section 21.

The mail accepting section 21 activates the header creating/analyzing section 22 and data creating/analyzing section 23 in response to electronic mail received from the terminal 1 through the transmitting/receiving section 26.

The header creating/analyzing section 22

detects and authenticates the contents of an instruction by analyzing the intra-header information of instruction mail or the like. The header creating/analyzing section 22 also creates intra-header information of response  
5. mail. That is, the header creating/analyzing section 22 is activated by the mail accepting section 21 to analyze the intra-header information written in the header of electronic mail. Upon detecting that the electronic mail is instruction mail, the header creating/analyzing  
10 section 22 performs authentication on the basis of the authentication information contained in the instruction mail, and checks the validity of the instruction/response. If personal identification is done, the header creating/analyzing section 22 creates,  
15 on the basis of the registration information, intra-header (response) information and authentication information to be attached to response mail to be transmitted to the terminal 1. In this case, as shown in Fig. 5B, a backup can be used as response  
20 information, and specific header information and personal identification information can be used as authentication information.

The data creating/analyzing section 23 decodes the text of reception mail on the basis of  
25 pre-registered registration information in accordance with the analysis result obtained by the header creating/analyzing section 22, and codes memory

information.

The mail creating section 25 writes the intra-header information created by the header creating/analyzing section 22 in the header of electronic mail, and writes the data created by the data creating/analyzing section 23 as data in the electronic mail text. The mail creating section 25 then outputs the resultant mail as backup response mail to the transmitting/receiving section 26. The transmitting/receiving section 26 outputs instruction mail received from the terminal 1 to the mail accepting section 11, and transmits the backup response mail created by the mail creating section 25 to the cell phone 2. The mail display section 27 displays electronic mail (backup instruction mail and restore instruction mail) received from the terminal 1.

The relationship between the functional blocks shown in Figs. 1 and 2 and the block elements shown in Figs. 3 and 4 will be described next. Referring to Fig. 1, the instruction mail creating section 1a of the terminal 1 is comprised of the key input section 10, mail accepting section 11, header creating/analyzing section 12, data creating/analyzing section 13, and mail creating section 15. The backup data creating section 1b is comprised of the mail accepting section 11, header creating/analyzing section 12, and data creating/analyzing section 13. The memory information

recording section 1c is comprised of the data  
creating/analyzing section 13 and recording section 14.  
The response mail creating section 2a and acceptance  
mail creating section 2c of the cell phone 2 are  
5 comprised of the header creating/analyzing section 22,  
data creating/analyzing section 23, and mail creating  
section 25.

Referring to Fig. 2, the instruction mail  
creating section 1d of the terminal 1 is comprised of  
10 the key input section 10, mail accepting section 11,  
header creating/analyzing section 12, data  
creating/analyzing section 13, and mail creating section  
15. The restore end confirming section 1e is comprised  
of the mail accepting section 11, header  
15 creating/analyzing section 12, and mail display section  
17. The restore data creating section 2e of the cell  
phone 2 is comprised of the mail accepting section 21,  
header creating/analyzing section 22, data  
creating/analyzing section 23, and mail creating section  
20 25. The completion notification mail creating section  
2f and acceptance mail creating section 2g are comprised  
of the header creating/analyzing section 22, data  
creating/analyzing section 23, and mail creating section  
25.

25 A case wherein the memory information recorded  
on the memory section 24 of the cell phone 2 is backed  
up to the hard disk of the terminal 1 or the like will

be described in detail next with reference to Figs. 6 to 8.

<Backup of Memory Information>

Backup instructing operation of the terminal 1  
5 will be described first with reference to Fig. 6. When  
the user operates the key input section 10 of the  
terminal 1 to issue a backup instruction for memory  
information in the cell phone 2 (step S11), the mail  
accepting section 11 activates the header  
10 creating/analyzing section 12 upon accepting the backup  
instruction. The header creating/analyzing section 12  
creates a backup instruction and authentication  
information as intra-header information by referring to  
the registration information 12b (step S12).

15 Note that if a mail text is required in  
issuing a backup instruction, the mail accepting section  
11 activates the data creating/analyzing section 13 as  
well. The mail creating section 15 creates backup  
instruction mail from the intra-header information  
20 output from the header creating/analyzing section 12  
(step S13). The mail creating section 15 transmits the  
mail output from the mail creating section 15 to the  
cell phone 2 (step S14).

The backup operation of the cell phone 2 will  
25 be described next with reference to Fig. 7. Upon  
receiving electronic mail through the  
transmitting/receiving section 26 (step S21), the cell

phone 2 transfers the mail to the mail accepting section  
21. Upon accepting the electronic mail, the mail  
accepting section 21 activates the header  
creating/analyzing section 22 and data  
5 creating/analyzing section 23.

The header creating/analyzing section 22  
analyzes the header portion of the electronic mail.  
Upon detecting, as a result of this analysis, that this  
mail is instruction mail having an instruction header  
10 for instructing to back up the memory information stored  
in the memory section 24 of the cell phone 2, the header  
creating/analyzing section 22 checks, on the basis of  
the authentication information in the header portion of  
the mail, the validity of a person who has issued the  
15 instruction, thereby performing authentication. When  
personal identification is done by authentication, the  
header creating/analyzing section 22 creates  
intra-header information (response header) of backup  
response mail by referring to registration information  
20 22b. The header creating/analyzing section 22 also  
creates intra-header information (instruction acceptance  
header) of backup instruction acceptance mail indicating  
the acceptance of the backup instruction (step S22), and  
instructs the data creating/analyzing section 23 to  
25 create the text of response mail.

Upon receiving an instruction to create the  
text of the backup response mail, the data

creating/analyzing section 23 reads out memory information from the memory section 24, and codes the memory information in accordance with the pre-registered registration information (step S25).

5           The mail creating section 25 writes the intra-header information in the header portion of the response mail created by the header creating/analyzing section 22, and writes the coded memory information created by the data creating/analyzing section 23 as a  
10 mail text, thereby creating backup response mail (step S26). The backup response mail is transmitted to the terminal 1 as a sender through the transmitting/receiving section 26 (step S27).  
Thereafter, the mail creating section 25 creates backup  
15 instruction acceptance mail having a header in which intra-header information indicating the acceptance of the backup instruction created by the header creating/analyzing section 22 is written (step S23), and transmits it to a pre-registered notification  
20 destination in accordance with the registration information (step S24).

Backup response mail receiving operation of the terminal 1 will be described next with reference to Fig. 8. When the mail accepting section 11 receives  
25 electronic mail through the transmitting/receiving section 16 (step S31), the terminal 1 activates the header creating/analyzing section 12 and data

creating/analyzing section 13, and requests the header creating/analyzing section 12 to analyze the reception electronic mail. The header creating/analyzing section 12 analyzes the header (response header) of the  
5 electronic mail and checks whether or not the mail is backup response mail for the backup instruction requested by the self terminal (step S32).

Upon detecting that the mail is backup response mail, the data creating/analyzing section 13  
10 decodes the mail text (step S33), and creates backup data of the memory information in the cell phone 2 (step S34). The created backup data of the memory information is recorded on the recording section 14 such as a hard disk (step S35). At this time, the data  
15 creating/analyzing section 13 also analyzes the header portion of the backup response mail, and performs authentication by checking the validity of the response from the authentication information. With the above operation, backup of the memory information in the cell  
20 phone 2 is completed.

**<Restoration of Memory Information>**

Operation to be performed when the memory information backed up to the terminal 1 is to be restored into the cell phone 2 will be described next  
25 with reference to Figs. 9 to 11.

Restore instructing operation of the terminal 1 will be described first with reference to Fig. 9.

When the user operates the key input section 10 of the terminal 1 to issue a restore instruction (step S41), the mail accepting section 11 activates the header creating/analyzing section 12 and data  
5 creating/analyzing section 13.

The header creating/analyzing section 12 creates information associated with memory information to be restored and authentication information as the intra-header information of restore instruction mail  
10 (step S42). The data creating/analyzing section 13 reads out, from the recording section 14, memory information (backup data) to be transmitted to the cell phone 2, and codes the information on the basis of registration information to create a mail text (step  
15 S43).

The mail creating section 15 creates restore instruction mail from the intra-header information created by the header creating/analyzing section 12 and the coded mail text created by the data  
20 creating/analyzing section 13 (step S44). The restore instruction mail output from the mail creating section 15 is transmitted to the cell phone 2 through the transmitting/receiving section 16 (step S45).

The restore operation of the cell phone 2 will  
25 be described next with reference to Fig. 10. Upon receiving electronic mail through the transmitting/receiving section 26 (step S51), the mail

accepting section 21 activates the header  
creating/analyzing section 22 and data  
creating/analyzing section 23. Upon analyzing the  
header (instruction header) of the electronic mail and  
5 detecting that the mail is restore instruction mail  
indicating restoration of memory information from the  
terminal 1, the header creating/analyzing section 22  
performs, on the basis of the authentication  
information, personal identification or the like by  
10 checking the validity of the person who has issued the  
instruction. If no problem is found in the  
authentication information as a result of the analysis  
of the header portion, the header creating/analyzing  
section 22 creates restore completion information  
15 (response header) and restore instruction mail  
acceptance information (instruction acceptance header)  
as intra-header information of the electronic mail (step  
S52). The data creating/analyzing section 23 decodes  
the text of the restore instruction mail on the basis of  
20 the registration information and restores the decoded  
data into the memory section 24 (step S55).

After the received mail test is decoded and  
restored into the memory, the mail creating section 25  
creates restore completion notification mail having a  
25 response header for notifying completion of restore from  
the header creating/analyzing section 22 (step S56), and  
transmits the mail to the terminal 1 as a sender (step

S57). In addition, the mail creating section 25 creates restore instruction acceptance mail having an instruction acceptance header for notifying restore acceptance (step S53), and transmits it to a registered 5 notification destination (step S54).

In the above restore operation, the header creating/analyzing section 22 creates restore completion information (response header) and restore instruction mail acceptance information (instruction acceptance header) before completion of restore. However, these pieces of information may be created after completion of restore. For example, at the time of transmission of each mail, corresponding header information may be created.

Fig. 11 shows the restore completion notification mail receiving operation of the terminal 1. When the terminal 1 receives restore completion notification mail through the transmitting/receiving section 16 (step S61), the mail accepting section 11 20 requests the header creating/analyzing section 12 to analyze the restore completion notification mail. The header creating/analyzing section 12 analyzes the header portion of the restore completion notification mail and confirms that the mail is response mail for a restore 25 instruction and memory information has been completely restored (step S63). In addition, the owner of the cell phone confirms completion of restore in accordance with

the result displayed on the mail display section 17.

The first embodiment has exemplified the case wherein backup and restore instructions from the terminal 1 are issued by operating the key input section 5 10. However, such instructions can be automatically issued at set timings by providing a backup scheduling section for the terminal 1.

The arrangement of the second embodiment will be described with reference to Figs. 12A and 12B. In 10 this embodiment, as shown in Fig. 12A, in the arrangement of the terminal 1 shown in Fig. 3, a backup schedule table 31 and time monitoring section 32 are newly added into the mail accepting section 11. Note that the backup schedule table 31 and time monitoring 15 section 32 may be provided in place of the mail accepting section 11.

The time monitoring section 32 manages time information and the like. The time monitoring section 32 always monitors the time schedule in the backup 20 schedule table 31, and inputs a backup instruction to a header creating/analyzing section 12 at the time written in the backup schedule table 31. With this operation, backup instruction mail is automatically transmitted to a cell phone 2 at the set time. As shown in Fig. 12B, 25 the terminal 1 receives backup response mail for the backup instruction mail from the cell phone 2, and automatically creates a backup of memory information by

using the header creating/analyzing section 12 and a data creating/analyzing section 13.

In this embodiment as well, authentication is performed by transmitting/receiving authentication information in a header portion. Upon accepting backup instruction mail, the cell phone 2 transmits instruction acceptance mail. The owner or the like of the cell phone 2 can automatically monitor the execution of backup of the memory information.

10           In the above embodiment, with regard to backup instruction acceptance mail/restore instruction acceptance mail associated with backup/restore operation, a backup/restore processing result is transmitted to a pre-registered transmission destination 15 for each backup/restore operation. However, a backup/restore processing result may be transmitted once a predetermined number of times of backup/restore operation or at predetermined time intervals.

In the above embodiment, the functional block portion (Fig. 1) for backup operation is separated from the functional block portion (Fig. 2) for restore operation for the sake of convenience. Obviously, however, this system integrally has the respective functional blocks. The header creating/analyzing sections 12 and 22 shown in Figs. 3 and 4 may be separated into a header creating section and header analyzing section. Likewise, the data

creating/analyzing sections 13 and 23 shown in Figs. 3 and 4 may be separated into a data creating section and data analyzing section.

According to the present invention,

- 5 backup/restoration of the memory information in a cell phone can be executed with safety and ease at an arbitrary time point by transmitting/receiving instruction/response mail between the cell phone and a terminal having an electronic mail
- 10 transmission/reception function. In addition, information associated with backup instruction mail and restore instruction mail, e.g., the reception and acceptance of backup instruction mail and the transmission, transmission date, and transmission count
- 15 of backup response mail, is notified to a pre-registered notification destination associated with the owner of the cell phone, thereby monitoring unauthorized use. This makes it possible to backup/restore the memory information in the cell phone with high security.
- 20 Therefore, the safety and reliability of the system can be maintained.

In addition, since a header portion contains authentication information for the user of a terminal which is personal identification information obtained as a result of computing specific header information according to a predetermined algorithm, different personal identification information is used for

transmission of each instruction mail. This makes it possible to construct a backup system with extremely high safety and reliability.

Furthermore, even if, for example, a cell  
5 phone is lost or stolen, memory information can be recovered by transmitting instruction mail from the terminal side to the cell phone.